[0062] FIG. **8** schematically shows a 2D overview of neighbouring sensors **28** (each comprising at least one sensing element **18**) of which capacitance change values are used in an algorithm for calculating the touch location according to an embodiment of the invention. The algorithm for calculating the touch location may use not only the sensor with the highest 'capacitive touch response signal' but also adjacent sensors that may have been partly activated, as is illustrated in FIG. **7***b*.

[0063] FIG. **8** shows a central sensor C, which is indicated by the sensor which shows the maximum registered change in capacity. Neighboring or adjacent sensors are E (East) in the negative X direction, and W (West) in the positive X direction, N (North) in the negative Y direction and S (South) in the positive Y direction. Between S and E sensors, sensor SE (South-East) is located. Likewise NE (North-East) between N and E, SW (South-West) between S and W and NW (North-West) between N and W.

[0064] With S as the signal per sensor (in counts), the total of counts of sensors contributing to the X or Y location determination become respectively (the subscript refers to the sensor as described above):

$$S_{X\text{-}total}=[S_E+S_{NE}+S_{SE}+S_C+S_{NW}+S_{SW}+S_W]$$

$$S_{Y\text{-}total}=[S_N+S_{NE}+S_{NW}+S_C+S_{SE}+S_{SW}+S_S]$$

[0065] The values for the S-coefficients will typically depend on the proximity of the respective sensor to the central sensor along the axis (X or Y) of interest.

[0066] The weighted centroid locations in X and Y directions are now defined as:

$$X_{centroid}=\left[\begin{array}{c}(X_E\cdot S_E)+(X_{NE}\cdot S_{NE})+(X_{SE}\cdot S_{SE})+(X_C\cdot S_C)+\\(X_{NW}\cdot S_{NW})+(X_{SW}\cdot S_{SW})+(X_W\cdot S_W)\end{array}\right]\Big/S_{X-total}$$

$$Y_{centroid}=\left[\begin{array}{c}(Y_N\cdot S_N)+(Y_{NE}\cdot S_{NE})+(Y_{NW}\cdot S_{NW})+(Y_C\cdot S_C)+\\(Y_{SE}\cdot S_{SE})+(Y_{SW}\cdot S_{SW})+(Y_S\cdot S_S)\end{array}\right]\Big/S_{Y-total}$$

The coordinate pair (Xcentroid, Ycentroid) is thus a floating point value rather than a discrete value. Therefore, the use of a weighted algorithm in combination with a resistive layer **10** according the invention improves the accuracy of the touch event location detection.

[0067] While the above example is given in reference to the diamond pattern of FIGS. **1** and **9**, the skilled person will be able to apply the example to other patterns, e.g. square grids, rectangular grids, etc. The skilled person will also be aware that other algorithms exist for calculating a floating point coordinate pair (X,Y) from a series of measurements at different discrete locations (C, E, SE, S, etc).

[0068] It is observed that, in the above specification, at several locations reference is made to "controllers" or "processors". It is to be understood that such controllers/processors may be designed in any desired technology, i.e. analogue or digital or a combination of both. A suitable implementation would be a software controlled processor where such software is stored in a suitable memory present in the touch panel device and connected to the processor/controller. The memory may be arranged as any known suitable form of RAM (random access memory) or ROM (read only memory), where such ROM may be any form of erasable ROM such as EEPROM (electrically erasable ROM). Parts of the software may be embedded. Parts of the software may be stored such as to be updatable e.g. wirelessly as controlled by a server transmitting updates regularly over the air.

[0069] It is to be understood that the invention is limited by the annexed claims and its technical equivalents only. In this document and in its claims, the verb "to comprise" and its conjugations are used in their non-limiting sense to mean that items following the word are included, without excluding items not specifically mentioned. In addition, reference to an element by the indefinite article "a" or "an" does not exclude the possibility that more than one of the element is present, unless the context clearly requires that there be one and only one of the elements. The indefinite article "a" or "an" thus usually means "at least one".

1. A touch panel device, comprising:
a cover layer;
a sensor layer comprising a plurality of sensing elements, the sensing elements being arranged side by side and insulated from each other;
an electrically-resistive layer disposed between the cover layer and the sensor layer; and
an adhesive layer disposed between the cover layer and the electrically-resistive layer,
wherein the electrically-resistive layer spaces apart the cover layer by the adhesive layer of a first distance, and spaces apart and insulated from the sensor layer by a second distance, wherein the first distance is smaller than the second distance,
wherein the electrically-resistive layer is an electrically non-insulating layer and has a sheet resistance between 1 MOhm/sq and 10,000 MOhm/sq, and wherein the electrical resistance of the electrically-resistive layer is lower than the electrical resistance of the cover layer and higher than the electrical resistance of the sensing elements.

2. A touch panel device as claimed in claim **1**, wherein the electrically-resistive layer has an electrical resistance suitable for causing, in response to a touch event above a center of a central sensing element, a detectable change in the capacitance as measured by at least two sensing elements adjacent to the central sensing element.

3. A touch panel device as claimed in claim **1**, wherein the sheet resistance of the electrically-resistive layer is preferably between 20 MOhm/sq and 5000 MOhm/sq.

4. A touch panel device as claimed in claim **3**, wherein the sheet resistance of the electrically-resistive layer is even more preferably between 100 MOhm/sq and 1000 MOhm/sq.

5. A touch panel device as claimed in claim **1**, wherein the electrically-resistive layer is formed on the underside of the cover layer.

6. A touch panel device as claimed in claim **1**, wherein the adhesive layer is an optical clear adhesive layer.

7. A touch panel device as claimed in claim **6**, wherein the electrically-resistive layer is a deposited layer on the adhesive layer.

8. A touch panel device as claimed in claim **1**, wherein the sensor layer is attached on a substrate layer.

9. A touch panel device as claimed in claim **8**, wherein the substrate layer comprises:
a reference electrode layer attached to the side opposite the side of the substrate layer to which the sensor layer is attached.